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United States Department of the Interior

NATIONAL PARK SERVICE
Channel Islands National Park
1901 Spinnaker Drive
Ventura, California 93001-4354

FISH AND WILDLIFE
SERVICE

N1615-CHIS

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October 15, 2004

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VENTURA, CA

Ms. Diane Noda
U.S. Fish & Wildlife Service
Ventura Field Office
2943 Portola Road, Suite B
Ventura, California 93003

Dear Ms. Noda:

DIANE

Thank you for your recent letter conveying to the National Park Service (NPS) the recommendations by the Island Fox Recovery Team, both the Recovery Coordination Group (RCG) and Task Force 3, regarding releases of island foxes to the wild this fall. We have reviewed both documents carefully. As you requested, I am writing to inform you of our decision and supporting analysis.

We intend to implement the RCG's Contingent Recommendations 2, 3 and 4, and all of recommendations of Task Force 3. Specifically, this will involve the release of selected captive-bred foxes on Santa Rosa and San Miguel Islands. Releases would begin on October 21, 2004. Additionally, exclusion fencing has been constructed around pens, except for one on San Miguel Island (scheduled for later this fiscal year), to eliminate interaction between wild and captive foxes, and pen materials have been ordered to accommodate foxes that may need to be brought in from the wild.

As the RCG stated, predation by golden eagles has varied across the northern islands, with the highest rate on Santa Cruz Island. For this reason, no releases of captive foxes are currently planned for Santa Cruz, as per Contingent Recommendation 2. We have been very encouraged by the establishment and production of foxes in the wild on Santa Rosa Island. For that reason, as per Contingent Recommendations 3 and 4, we plan to release more foxes on Santa Rosa, and to begin releases on San Miguel Island, which is located the furthest from the area of highest golden eagle use.

The current data are insufficient to evaluate the costs and benefits of a fox release versus a fox retention strategy. The planned releases greatly increase the information available for evaluation, however, our release strategy incorporates the safeguards recommended by Task Force 3 to ensure that golden eagle predation cannot have a long-term impact on any island fox subspecies. At the same time, conducting these limited releases affords the advantages identified by the RCG:



- 1) population growth rates might be higher in the wild,
- 2) releases may provide an opportunity to compare alternative release methods,
- 3) releases may provide a measure of the current risk of eagle predation,
- 4) releases may reduce the risk of catastrophic loss of captive populations, and
- 5) released foxes might avoid potential loss of the natural behaviors in captivity that facilitate survival and fitness in the wild.

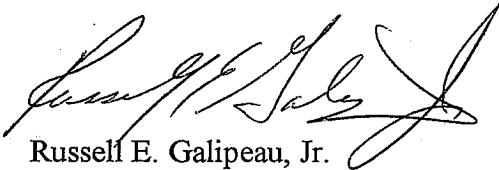
As recognized by both the RCG and Task Force 3, regular monitoring of released foxes, which is crucial to ensuring that fox populations increase over time, is an integral part of our release operation.

I have enclosed our *Plan for Release of Captive-Bred Island Foxes (Urocyon littoralis) on San Miguel and Santa Rosa Islands, 2004*, which states the rationale for releases, contains a schedule for releases, details on the release methodology, procedures for monitoring health and mortality, and established thresholds for re-capture.

If you have any questions about the release plan, please contact me at (805) 658-5702.

I appreciate your timely consideration of this.

Sincerely,



Russell E. Galipeau, Jr.
Superintendent

Enclosure

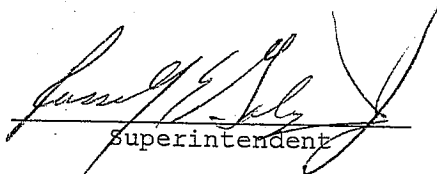
PLAN FOR
RELEASE OF CAPTIVE-BRED ISLAND FOXES (*Urocyon littoralis*)
ON SAN MIGUEL AND SANTA ROSA ISLANDS
2004

Tim Coonan

National Park Service
Channel Islands National Park

October 2004

APPROVED BY:


Superintendent

DATE: 10/12/04

Summary

In order to recover wild populations of island foxes (*Urocyon littoralis*), the National Park Service proposes to continue release of foxes to the wild on Santa Rosa Island, and begin release to the wild on San Miguel, in fall 2004. These releases were recommended by Task Force 3 of the Integrated Island Fox Recovery Team. The Task Force did not recommend releasing foxes to the wild on Santa Cruz Island, and therefore releases from captivity on Santa Cruz are not being proposed at this time.

These actions are possible and appropriate because:

- Captive populations on San Miguel and Santa Rosa Islands have grown to targeted levels (20 pairs) previously identified as necessary to establish and annually augment wild populations.
- Wild populations of each subspecies need to be established and increased to population sizes likely to persist over time, in order for them to be considered recovered.
- Complete removal of golden eagles (*Aquila chrysaetos*) is not probable with current methods and efforts. Since fall 2003, NPS and The Nature Conservancy spent approximately \$425,000 on eagle removal, and only 3 adult birds were captured. Other methods, such as lethal removal, are unlikely to be authorized in the foreseeable future. Therefore, recovery of foxes must necessarily occur under conditions of incomplete removal of golden eagles.
- One of 12 foxes released to the wild on Santa Rosa in 2003/2004 was killed by golden eagles, in contrast, 5 of 9 released foxes were killed by eagles on Santa Cruz Island. The latter is where the bulk of eagle activity and breeding occurs, and it is likely that the higher mortality rate on Santa Cruz Island is due to the proximity of those foxes to eagle territories. Therefore, foxes released to the wild on Santa Rosa and on San Miguel likely face a reduced risk of predation compared to those released on Santa Cruz Island.
- Delaying releases until eagles are gone is undesirable for two reasons. First, the primary goal of the NPS is to restore natural populations of island fox. Releasing foxes to the wild as soon as is practical increases the chances that the cumulative effects of captivity will be overcome and that a wild population will survive. Second, we are encountering problems in captive breeding (pen-mate aggression, lack of reproduction) which would not occur in a wild population. Two of the individuals released on Santa Rosa in 2003/2004 were a mated pair that had failed to reproduce in captivity. In the wild, they produced a litter of two pups in spring 2004.

In fall 2004 up to 10 island foxes will be released to the wild from the captive breeding facility on San Miguel Island, and up to 12 will be released on Santa Island. The purpose of the release is to

- begin reestablishment of wild populations;
- investigate survivorship of captive island foxes released to the wild, under conditions of partial removal of golden eagles, and compare survivorship to that of wild island foxes; and
- evaluate release methods

Because the female which bred in the wild on Santa Rosa Island is a new founder for the population, one of the two female pups from her litter will be brought in from the wild for breeding in captivity, and an additional (13th) Santa Rosa captive fox will be released in exchange.

Candidates for release were chosen according to genetic considerations. A task force of the Island Fox Integrated Recovery Team used relatedness and pedigree data to choose candidates whose release would not compromise proper genetic management of the captive populations.

Two types of groups will be released: groups of unmated foxes which have undergone a period of socialization, and potential mated pairs. Animals to be released together as pairs or in groups will be housed together for 7-14 days prior to release. Future releases may also include family groups (mated pairs and offspring born in captivity). This will allow evaluation of several types of release groups across several islands.

Released foxes will be monitored via radiotelemetry for survival, activity patterns, dispersal from the release site, and habitat use. Supplemental food will be provided for released foxes for a limited time after release. Released foxes will be periodically live-trapped after release to monitor body weight and condition.

As a contingency for possible mortality due to eagle predation, released foxes will be returned to captivity if predation on released foxes reaches a pre-determined threshold. Those thresholds, recommended by Task Force 3 of the Island Fox Integrated Recovery Team, are 30% of the release group on San Miguel, and 40% of the release group on Santa Rosa. Triggers for increased monitoring are 10% on San Miguel and 20% on Santa Rosa. Thus, if 3 of the 10 foxes released on San Miguel die from eagle predation, the remaining animals will be trapped and returned to captivity. Likewise, if 5 of the 12 released Santa Rosa foxes die from eagle predation, the remaining foxes will be brought back into captivity.

Introduction

In 2004 the U.S. Fish and Wildlife Service listed as endangered four of the six subspecies of island foxes (*Urocyon littoralis*), including the three subspecies inhabiting Channel Islands National Park: San Miguel Island fox (*U. l. littoralis*), Santa Rosa Island fox (*U. l. santarosae*), and Santa Cruz Island fox (*U. l. santacruzae*). Since 1999 the National Park Service has been implementing aggressive recovery actions for island foxes on San Miguel and Santa Rosa Islands, including removal of golden eagles (*Aquila chrysaetos*) and captive breeding of island foxes. Additionally, the NPS and The Nature Conservancy began captive breeding of island foxes on Santa Cruz Island in 2002.

Until captive foxes were released to the wild on Santa Rosa Island in winter 2003-2004, island foxes were functionally extinct on both Santa Rosa and San Miguel islands. Island foxes cannot be considered recovered until wild populations are reestablished and increased to levels which are large enough to resist extinction, with stable or increasing population trend (Coonan 2003). Because this will require approximately 10 years of captive breeding and annual release to the wild, establishment of the wild populations should begin as soon as possible.

With the addition of pups on San Miguel and Santa Rosa Islands in 2004, each island has reached or exceeded the target captive fox population level that allows annual release to the wild. Demographic modeling (Roemer et al. 2001) was used to set augmentation rates that would recover island fox populations to viable levels within a reasonable time frame. Thus, release of 12-20 foxes annually would reestablish a wild population of 200-300 foxes within a decade. Using reproductive rates from studies of wild island foxes, it was determined that a captive population of 20 pairs would be required to produce and release 12-20 foxes per year. These target population levels were identified in the park's recovery strategy for island foxes (Coonan 2003). After 5 years of captive breeding, the San Miguel captive population has grown to 50 foxes (27M:23F) (Fig. 1). Similarly, the captive population on Santa Rosa has grown to the current number of 56 in captivity (25M:31F), and 8 in the wild. Releases could therefore occur on each island while maintaining the targeted 20 pairs in captivity.

Although it would be ideal to release foxes into an eagle-free environment, golden eagles are unlikely to disappear from the islands in the next few years. Although 38 golden eagles have been removed since 1999, the eagle removal effort has been unable to completely remove all golden eagles. Whereas an upcoming review of the eagle removal effort may result in the application of different methods, such methods are unlikely to bring about removal of all eagles. Golden eagle presence on the northern Channel Islands may eventually diminish due to removal of feral pigs (*Sus scrofa*) from Santa Cruz Island, scheduled to commence in 2004, and reestablishment of bald eagles (*Haliaeetus leucocephalus*). Until such time, recovery of foxes must necessarily occur under conditions of incomplete removal of golden eagles.

Results from monitoring wild and released foxes on Santa Cruz Island, and released foxes on Santa Rosa Island, suggest that although eagle removal is incomplete, conditions may allow for initial recovery of island foxes. A radiotelemetry study conducted on Santa Cruz Island since 2002 provides evidence that although eagle predation is ongoing, annual survival of wild island foxes has increased during the period of eagle removal, and is at or above 80%, the target identified by demographic modeling as necessary for a stable or increasing population. However, eagle predation on foxes released to the wild from captivity on Santa Cruz Island in 2002-2003 was substantially higher than predation on wild foxes. Nine of 12 foxes released from captivity on Santa Cruz were killed by golden eagles within several weeks of release. Predation was not as severe on foxes released to the wild on Santa Rosa in 2003-2004, where 1 of 12 released foxes was killed by golden eagles. Consequently, foxes released on Santa Rosa and San Miguel Islands in fall 2004 would presumably be at less risk from eagle predation than those on Santa Cruz Island.

Four of the 12 foxes released to the wild on Santa Rosa were returned to captivity because their use areas included the captive pen sites. Interactions between captive and wild foxes, especially during the breeding season, resulted in injuries to both wild and captive foxes. Perimeter fences are being constructed around both breeding sites on Santa Rosa, and around one on San Miguel, to prevent this from occurring with future releases. Eventually, having more animals in the wild, with a more balanced sex ratio, should make the captive facilities less attractive to released foxes.

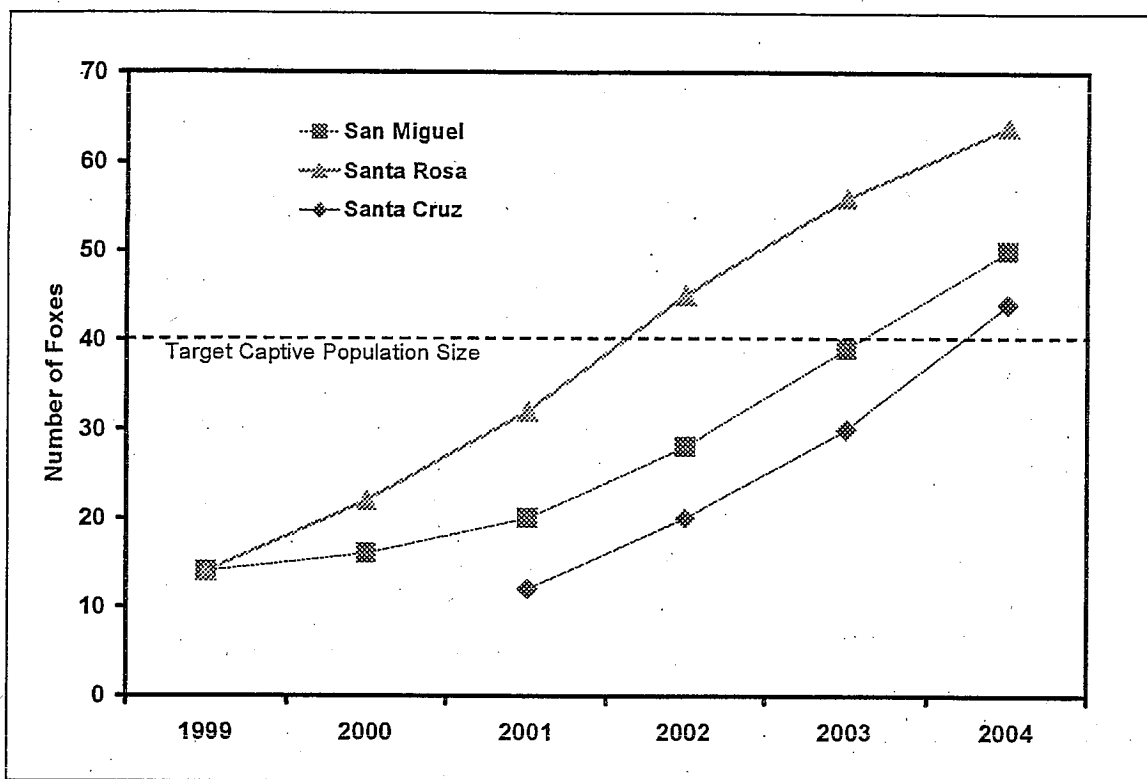


Figure 1. Growth of captive island fox populations on the northern Channel Islands.

Two of the foxes released on Santa Rosa bore a litter of 2 pups in spring 2004. The pair (female 33131 and male A045A) had been housed together since 2000, and had failed to breed in captivity. The female is a wild-born fox brought into captivity, and her successful production in 2004 adds another founder to the previous 11 in the Santa Rosa population. For some pairs or individuals, conditions in the wild may be more optimal for breeding than conditions in captivity.

At this juncture we are not proposing 2004 releases for Santa Cruz Island foxes, where island foxes are managed jointly by NPS and TNC. The bulk of golden eagle use has occurred on that island, and predation upon foxes released from captivity has been considerable. At the same time, the extant wild population on that island serves as a hedge against extinction. Because of the wild population, Santa Cruz has a safeguard that is currently unavailable on San Miguel and Santa Rosa Islands, and there is less urgency to release foxes to the wild on Santa Cruz Island.

Purpose and Need

Because the success of further eagle removal remains uncertain, island fox recovery may necessarily occur in an environment with eagles. Recent estimates of annual fox survivorship on Santa Cruz Island exceeded that required for a stable or increasing population. Whereas island foxes released from captivity suffered considerable predation, those released on Santa Rosa Island did not. Limited releases of captive island foxes on San Miguel and Santa Rosa Islands, coupled with intense post-release

monitoring, will indicate whether survivorship of released foxes is acceptable, and whether recovery of wild populations can commence, under current conditions.

In fall 2004 up to 10 island foxes will be released to the wild from the captive breeding facility on San Miguel Island, and up to 12 from the captive breeding facility on Santa Rosa Island. The purpose of the release is to

- begin reestablishment of a wild population on San Miguel Island, and continue reestablishment of a wild population on Santa Rosa Island
- investigate survivorship of captive island foxes released to the wild, under conditions of partial removal of golden eagles, and compare survivorship to that of wild island foxes, and
- evaluate release methods

Release Plan

General Methods

In 2004, foxes will be released as groups of unmated animals, and as pairs of potential mates. Family groups will not be released this year. Groups of juveniles have been successfully released on Santa Catalina Island following a period of group socialization in a pen (Timm et al. 2002), and groups of socialized foxes were released on both Santa Cruz and Santa Rosa Islands in 2003 (Coonan et al. 2004).

Mated pairs that have been housed in captivity together, but have failed to mate, have been released in previous years. The 2003/2004 Santa Rosa release group included a pair (RM03 and RF106) which had been paired in captivity for three years but had failed to breed. In the wild, they produced a litter of 2 foxes in spring 2004.

The specific method to be used is a modified hard-release. A hard-release is one in which captive animals are released into the wild with no preparation of the animals prior to release, and no post-release training, whereas the soft-release method includes pre- and/or post-release conditioning (Kleiman 1989). Under typical hard-release procedures, animals are transported from the captive facility or capture area to the release site and then released without the use of acclimation pens or supplemental care after release. Alternatively, a typical soft-release can include the construction of holding pens in the release area to acclimate the animals, and a sustained supplemental feeding program until such time as the animals can provide for themselves. A third option is a modified hard or modified soft release, the distinction depending on the level of post-release supplemental care and the relative amount of time spent in the release area prior to release.

There are no general guidelines for canid release methods, and success has been achieved with both hard and soft-release methods. The swift fox project in Canada used both soft-release (136 animals) and hard-releases (719 animals), with wild (a minimum of 500) and captive foxes (a minimum of 300), and varied the season for release in the first few years of the project (Cotterill 1997). In the end hard releases were used exclusively after 1987 when it was determined that survival rates did not vary significantly between techniques and that hard releases were

more cost effective (Carbyn et al. 1994). Both soft and hard releases were used for the Mexican wolf (*Canis lupus baileyi*) (Paquet et al. 2001) and red wolf (*Canis rufus*) (Phillips 1995) recovery programs.

For several reasons, a modified hard-release methodology will be used for island fox releases on the northern Channel Islands. While it might be advantageous to build soft-release pens in the release areas, logistics prevent this from being practical. Because of the prodigious climbing ability of island foxes, all captive pens must be roofed; this severely constrains the size of any pen built on a temporary basis in a release area. Soft-release pens can also be used to acquaint a captive animal with the surroundings of the release site, which may differ considerably from the environment of a captive breeding facility. This is not a factor for island fox captive breeding on Santa Rosa and San Miguel, since island fox captive facility sites are very similar to release sites.

Thus the 2004 releases will be modified hard releases, with supplemental feeding after release. Such feeding will ease the transition to the wild, may enhance initial survivorship, and will encourage released animals to stay in or near their release sites.

Table 1. Island foxes selected for release to the wild, San Miguel Island, 2004.

PIT#	Sex	Age	Born	Sire	Dam	Release Area	Date	Release Type
B4E60	M	2		44829	90D1A	SMH/GM ²	10/27	Group
E270B	M	2		44829	90D1A	"	"	Group
E770A	F	0.5		47B06	E2677	"	"	Group
83C24	M	3		44829	90D1A	"	"	Group
D7074	F	0.5		47B06	E2677	"	"	Group
70CID	M	3	C ¹	44829	90D1A	"	"	Group
23B15	F	0.5		47B06	E2677	"	11/04	Group
D1531	M	0.5		44829	90D1A	"	"	Group
06E4A	F	0.5		47B06	E2677	"	"	Group
84E33	M	1		44829	90D1A	"	"	Group

¹C = captive; W = wild
²SMH/GM = San Miguel Hill/Green Mountain

Release Groups

Animals were chosen for release based on genetics, age, and reproductive success. The program Population Management 2000 was used by Colleen Lynch of the American Zoo and Aquarium association to choose animals for release which were well-represented in the captive population (Appendix A). Potential loss of such animals in the wild therefore would not impact genetic management of the captive population. Successful breeders in captivity will not be released, and preference for release is given to animals which are older than juvenile (first-year) age, because of the latter's lower survival in the wild. Several foxes which were 10 years old or older were also deemed not eligible for release.

2004 Island Fox Release Plan

Because the female which bred in the wild on Santa Rosa Island is a new founder for the population, one of the two female pups from her litter will be brought in from the wild for breeding in captivity, and an additional (13th) Santa Rosa captive fox will be released in exchange.

Table 2. Island foxes selected for release to the wild, Santa Rosa Island, 2004.

PIT tag	Sex	Age	Born	Sire	Dam	Release Area	Date	Release Type
B4B2B	M	4	C ¹	F0223	F4A18	TP ²	10/21	Pair with F3950
F3950	F	3	C	0654E	D187A	"	"	Pair with B4B2B
10445	F	3	C	70518	10030	"	"	Pair with D4C78
D4C78	M	1	C	0654E	D187A	"	"	Pair with 10445
37C61	F	4	C	F0223	F4A18	"	"	Pair with 51E3E
51E3E	M	2	C	70518	10030	"	"	Pair with 37C61
E5100	F	4	C	F0223	F4A18	Arl	10/27	Pair with 7305C
7305C	M	0.5	C	70518	10030	"	"	Pair with E5100
C586D	F	3	C	F0223	F4A18	"	"	Pair with 03332
03332	M	0.5	C	70518	10030	"	"	Pair with C586D
2571A	F	2	C	0654E	D187A	"	"	Group
4A7105	F	3	C	0654E	D187A	"	"	Group
7792E	M	2	C	84F28	95B34	"	"	Group

¹C = captive; W = wild
²TP = Torrey Pines, Arl = Arlington Canyon

Pre-Release Preparations

1. Animals slated for release as pairs or as members of release groups will be housed together 7-14 days prior to release. However, males which have a history of injuring pen-mates will not be housed with other animals prior to release, so as to reduce the risk of injury to other foxes.
2. Animals to be released will be fed as much natural prey as possible and in such a way as to encourage foraging.
3. Foxes slated for initial release were given annual vet check ups in summer 2004. A physical examination of each fox prior to transport to release site will be conducted to insure each fox is in good physical shape. All released foxes will be vaccinated against canine distemper (Purevax Ferret Distemper vaccine, Merial, Inc., Athens, GA), if the vaccine becomes available prior to the October and November release dates (the vaccine has not been available in summer 2004, due to backorder).
4. Prior to release each fox will be outfitted with a 53-gram radio collar (Advanced Telemetry Systems, Isanti, MN) to allow for tracking, mortality monitoring, and potential recovery from the field.
5. Remote feeding stations will be placed in the release area. Stations will be placed in areas of vegetation to provide cover for the foxes if used during the day, and provisioned at dusk to promote nocturnal

feeding. These stations may be moved, depending upon the actions of released foxes.

Release Sites

San Miguel Island

Due to San Miguel's small size (38.6 km², or 9,546 a) and relatively gentle terrain, released foxes would have little difficulty dispersing from a central release site to any area on the island. Therefore the release site for the 10 foxes to be released in 2004 is the geographic center of the island, between Green Mountain and San Miguel Hill (Fig. 2).

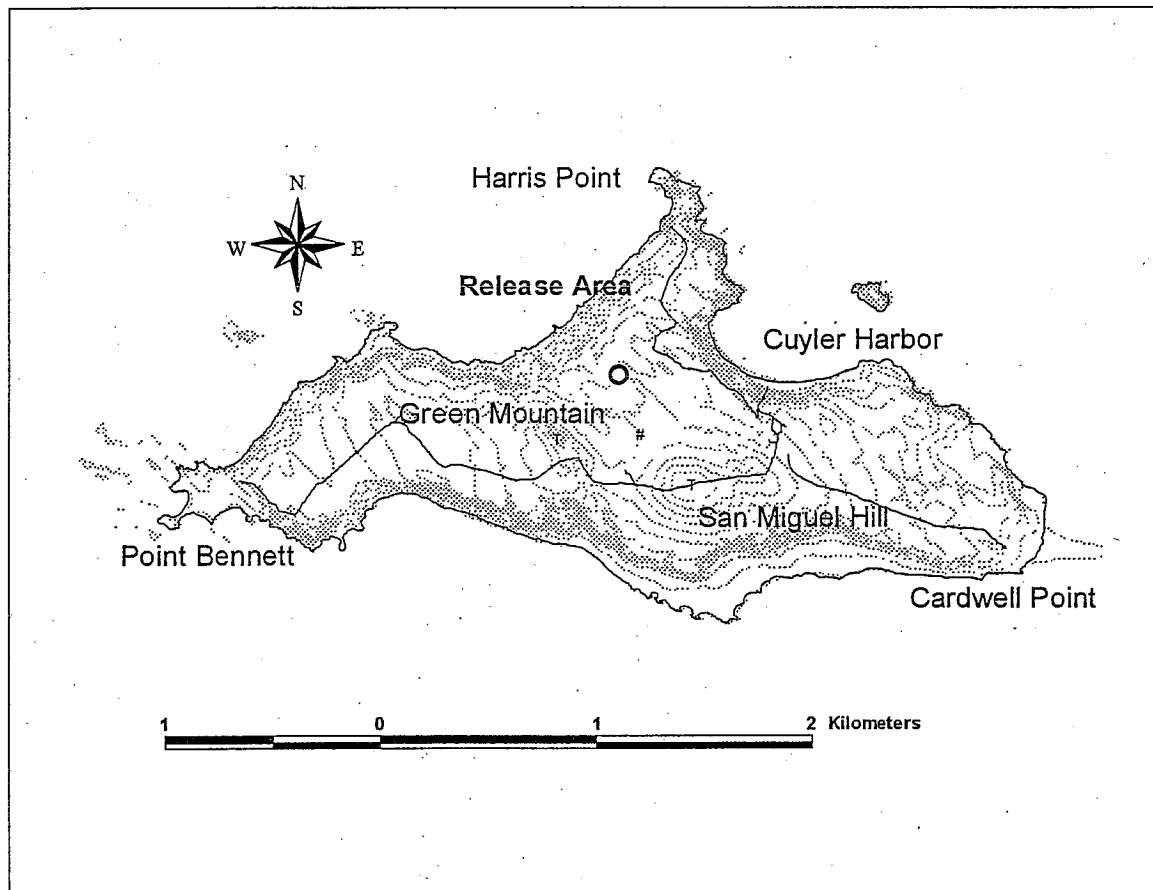


Figure 2. San Miguel Island release area, 2004.

Santa Rosa Island

In 2003/2004 foxes were released to the wild from sites in Lobo, Arlington and Tecolote Canyons (Coonan et al. 2004). The Arlington release site, located in the area which was the last refuge for island foxes prior to bringing them into captivity in 2000, will be used again in fall 2004 (Fig. 3). An additional release site, the Torrey Pines area, will be added in 2004. Foxes released from the 2003 release sites generally dispersed to the Carrington, Windmill, and Cherry Canyon areas, though one fox dispersed to the China Camp area, and another to the Sierra Pablo area.

Release Protocol

1. Foxes will be captured in the pen, examined and radio collared, then transported in Vari-kennels to the release area. Release will occur in late afternoon, in an area providing immediate vegetation cover for the foxes. Foxes will be released 1 hour prior to sunset to minimize initial exposure to predation.
2. All release personnel will depart the area as quickly as possible with one or two remaining at a distance to monitor initial release movements.
3. Three to 5 bait stations (Tomahawk box traps wired open) within the release areas will be baited with scent attractant and kibble (dry dog food) for the released foxes.
4. Releases will be staggered (Table 3) to provide adequate staff coverage for release, post-release monitoring, and periodic trapping.

Table 3. Release schedule, San Miguel and Santa Rosa Islands, 2004.

Date	Island	Release Site	Number of Foxes
10/21/2004	Santa Rosa	Torrey Pines	6
10/27/2004	Santa Rosa	Arlington Canyon	6
10/27/2004	San Miguel	San Miguel Hill/Green Mountain	6
11/04/2004	San Miguel	San Miguel Hill/Green Mountain	4

Post-Release Monitoring

To track survivorship of released animals, mortality checks of radio-collared foxes will be conducted daily for the first week after release, three times per week during the first month, and then at least twice a week for the remainder of the year. Monitoring will generally be conducted from a distance to avoid disturbing the foxes. However, if there is concern for a specific individual based on their behavior as determined by telemetry, a "walk-in" will be conducted to check on the individual. During the first 2 months, some night-time monitoring will be conducted to establish activity patterns and habitat use of released foxes.

During this 2-month time frame feeding stations will be supplied with food daily for the first two weeks, and then 3 times a week for the following two weeks. Examination of fecal samples will determine whether released foxes have shifted from provisioned foods to natural foods. Stations will be elevated on Santa Rosa Island to discourage use by island spotted skunks (*Gracilis amphiala santacruzae*) but need not be elevated on San Miguel Island, where skunks do not occur.

Released animals will be trapped at one week and one month post-release to evaluate their condition. If released foxes have lost >20% of their weight at release, then individuals will be returned to captivity until they gain weight.

If a mortality signal is detected, the carcass will be recovered as soon as possible and sent to the Veterinary Medical Teaching Hospital, University of California-Davis, for necropsy.

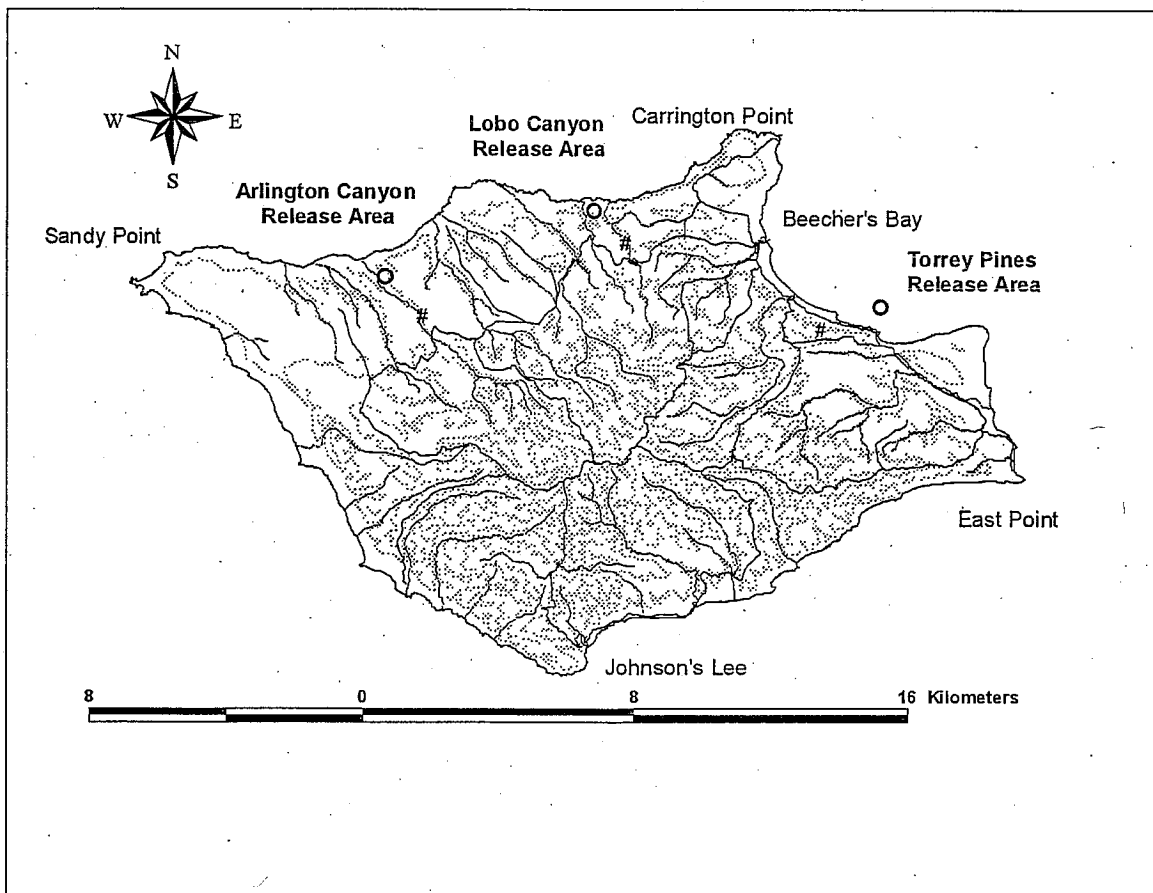


Figure 3. Santa Rosa Island release areas, 2004.

Short-term Monitoring (6 months following release)

Timing: October 2004 through March 2005

1. At a minimum, daily mortality checks will be conducted for the first week after release to determine status of newly released foxes. Such checks will be conducted three times a week for the first month, and then at least twice a week for the remainder of the year.
2. In the event that a mortality signal is detected, efforts will be made to locate and collect the carcass without delay; transfer to the mainland for a thorough necropsy should occur as soon as possible.
3. Following periods of inclement weather when prolonged vehicle access to the islands is limited, fixed-wing aircraft may be utilized to ascertain the location and/or mortality status of collared animals.
4. Emergency recapture of released foxes will occur if the predation mortality rate reaches 30% of the number of foxes released on San Miguel, or 40% of the number of foxes released on Santa Rosa. If these triggers are reached, then a concerted effort will be made to trap remaining foxes and bring them back into captivity. Thresholds are also set for increased monitoring, when all released foxes are to be monitored on a daily basis. These triggers for increased monitoring are 10% mortality of released animals on San Miguel, and 20% mortality of released animals on Santa Rosa.
5. Low-error UTM coordinate locations should be determined for each animal, at a minimum, three times a week. Methods for such data collection include single person radio telemetry tracking and compass triangulation, or two-person telemetry tracking and simultaneous compass biangulation. Observation of telemetered animals will be made opportunistically, but not sought out. As personnel and scheduling permits, location points should be sought at varying hours of the day, as well as during nighttime hours.
6. For mortality monitoring, island personnel may be able to obtain telemetry signals from the top of accessible island peaks using a Yagi hand held antennae, or, depending on terrain, by rooftop antennae while driving existing island roads. Access of all island roads will be sought using SUV and ATV modes of transportation. In order to triangulate exact animal locations, however, accessing island topography by foot will often be required.
7. To determine behavior, movement and activity patterns of newly released foxes, monthly diels should be conducted on individual animals, as staffing permits. Diel periods will consist of 6, 12 or 24 hour monitoring periods where location coordinates on a pre-selected animal are determined every half hour.
8. Additional monitoring of fox health, food habits, and activity can be attained by setting up remote camera stations at food supplementation sites that will be available to foxes for the first month following release.
9. Fecal samples should be collected near release/feeding stations and along roads to determine post-release diet, and to determine when fox diets shifts from supplemented foods to natural foods.

10. Trapping should be conducted to recapture all foxes at the end of the 1st month following release, in order to monitor health of individuals (weight, physical condition of animal, administration of booster shots, assessment of teeth, etc.)

Interim Monitoring (6-12 months following release)

Timing: May 2005 through October 2005

1. At a minimum, mortality checks should be conducted two times a week for the remainder of the first year following release.
2. In the event that a mortality signal is detected, concentrated efforts should be made to locate and collect the carcass; transfer to the mainland for a thorough necropsy should occur as soon as possible.
3. Precise UTM coordinate locations should be determined for male and non-reproductive (juvenile) foxes, at a minimum, two times a week. Females that may be establishing den sites should be located daily. Methods for such monitoring include radiotelemetry tracking and compass triangulation, as well as direct observation when possible. As personnel and scheduling permits, location points should be sought at varying hours of the day, as well as during nighttime hours.
4. During the denning season (May-June) paired foxes should be closely monitored through daily telemetry in an effort to determine the location of den sites. From June through July, efforts to ascertain the reproductive success of fox pairings should be made through direct observation, den visits, or trapping. Pups should be captured prior to dispersal for a full veterinary examination, identification marking, and possible outfitting with radiotelemetry collars.
5. Following periods of inclement weather when prolonged vehicle access to the islands is limited, fixed-wing aircraft should be utilized to ascertain the location and/or mortality status of collared animals.

Mitigation Measures and Contingency Plan

The following *mitigation measure*, mentioned previously, will be implemented:

- Provide supplemental food to island foxes immediately following release.

The following *contingency measures* will be implemented if released foxes incur significant mortality from eagle predation:

- Capture released foxes and return them to captivity if the following thresholds for predation mortality are met:

San Miguel

10% mortality (1 of 10 released)

Increase monitoring

30% mortality (3 of 10 released) Recapture remaining foxes

Santa Rosa

20% mortality (2 of 12 released) Increase monitoring

40% mortality (5 of 12 released) Recapture remaining foxes

Environmental Planning

The primary action to be implemented via this project is categorically excluded from the National Environmental Policy Act compliance process, because it has no potential, either individually or cumulatively, for significant environmental impact (Director's Order #12, Conservation Planning, Environmental Impact Analysis and Decisionmaking; NPS 2001). Captive breeding and reintroduction of island foxes is categorically excluded under the following categorical exclusion from Director's Order #12 (NPS 2001, section 3.4):

E. (2): Restoration of non-controversial native species into suitable habitats within their historic range.

None of the exceptions to categorical exclusions (NPS 2001, section 3.5) apply. Therefore, no environmental assessment or environmental impact statement will be prepared for the actions proposed in this recovery plan. The actions fall into the group of categorical exclusions for which a record is required (NPS 2001, section 3.4). Categorical exclusion forms for the individual actions of this project will be completed and kept on file at Channel Islands National Park Headquarters, Ventura, California.

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